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 DOS accounting revisited. (DacEasy's DacEasy Accounting 4.4, M-USA's
 Pacioli 2000 2.0 and Peachtree Software's Peachtree Complete Accounting
 for DOS 7.0 integrated accounting software packages) (Software Review)
 (Windows of Opportunity) (Evaluation)
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ABSTRACT: Three MS-DOS-based integrated accounting software packages are
reviewed, including DacEasy's $149.95 DacEasy Accounting 4.4, M-USA's $49
Pacioli 2000 2.0 and Peachtree Software's $249 Peachtree Complete
Accounting for DOS 7.0. DacEasy Accounting is a full-featured program that
continues to add new features on every upgrade. It includes Accounts
Payable, Accounts Receivable, General Ledger, Cash Management, Inventory,
Purchase Order, Fixed Assets and Billing modules, with Order Entry and
Payroll modules available for an additional price. Pacioli 2000 is a
sophisticated program, although it is not helpful for inexperienced users.
Peachtree Complete Accounting is a complete, flexible package, offering
nine modules and a useful Data Query module that allows users to write
queries, reports and graphs.

TEXT:
     The Windows-DOS debate is far from over in the accounting-software
arena. Before moving to the Microsoft Windows side, take a good, close look
at your accounting needs. Few would debate the ease of using a Windows
accounting system, but these apps don't yet match the functionality of the
leading DOS products.
     The sophisticated features offered by DOS packages--such as serialized
inventory, full Order Entry capabilities, consolidations, LIFO and FIFO
costing, and strong multiuser capabilities--should attract midsize or
growing companies and may in fact exceed a small business's needs.
     The DOS appeal also extends to performance issues. DOS packages work
well on a wider spectrum of hardware than do Windows packages--and more
reliably. Also, in Windows you really need a speedy processor and plenty of
memory.
     To keep you in touch with the state of low-cost DOS accounting, we
revisit three classics: DacEasy Accounting, M-USA Business Systems' Pacioli
2000, and Peachtree Complete Accounting. These are proven workhorses, laden
with accounting features. You won't find built-in PIMs or pretty
check-writing screens here--just accounting, and plenty of it. Though all
three vendors have released Windows products (DacEasy for Windows should be
out by the time you read this), each has expressed strong commitments to
the DOS market and continued investment in product enhancements.
     DACEASY ACCOUNTING
     DacEasy (214-732-7500) was the first to offer a feature-rich
accounting system at a rock-bottom price. Version 4.4 of DacEasy
Accounting, $149.95, continues the upward-spiraling features trend. Modules
include G/L, A/P, A/R, Billing, Cash Management, Purchase Order, Inventory,
and the newcomer Fixed Assets.
     DacEasy's account numbers can be up to ten digits and, through the use

of account levels, you can define account roll-ups and reporting formats. G/L transaction types include both reversing and recurring entries, and transaction detail can be maintained for the entire fiscal year. DacEasy can maintain budgets by period for each account but not last-year or future-year budgets.

A Report Generator supplements DacEasy's standard reports. It is quite powerful, but a bit daunting at first. Fortunately, there are 19 sample reports to help you.

New in this version of DacEasy is the ability to create customized invoices, purchase orders, statements, and labels. Also, notes can be maintained for customers, vendors, and products. The Cash Management function handles transactions directly affecting cash, including receipts, payments, and adjustments. To round things out, DacEasy offers a well-designed bank reconciliation module. Those with high-volume bank statements will appreciate how easy it is to mark transactions as cleared and enter adjustments such as bank charges, interest earned, and corrections. A running balance is continuously displayed at the bottom of the screen.

DacEasy's native billing function supports the sale of both products and services. While most small businesses will find this adequate, those with heavy order processing needs will want to consider the $199.95 Order Entry module. Prominent features here include tracking serial numbers of items sold, maintaining salesperson commissions, and printing picking slips and RMAs.

You can set up multilevel tax tables to calculate appropriate sales taxes, but these cannot be associated with the customer's ship-to address; no standard sales-tax reports are provided.

DacEasy's bill-of-materials function supports businesses with simple product-assembly needs. Inventory costing methods include standard, average, and last-purchase cost. An inventory-alert report lists items below minimum quantity levels. Payroll is offered at an additional price of $149.95.

PACIOLI 2000

When it was introduced several years ago, M-USA's Pacioli 2000 caused quite a stir by offering a relatively high level of functionality for a mere $49. Pacioli 2000, now in Version 2.0, consists of eight modules: G/L, A/P, A/R, Billing, Inventory, Purchasing, Budgeting, and Auditing. M-USA provides its separate Payroll module free to new Pacioli 2000 buyers; for others the module costs $25.

Experienced accounting users will quickly notice Pacioli's streamlined menu choices. With only four pull-down menus--and relatively few subchoices--you would swear there wasn't much to this package. Once you see that Pacioli maintains its customers, vendors, and chart of accounts in one file, however, and that all invoicing and payable transactions occur on the same screen, you realize that there's more here than you originally thought.

Pacioli doesn't do much to help new users get started. Only one sample chart of accounts is provided, and the sample company doesn't include any customers, vendors, or transactions. Furthermore, the on-line help is brief and simplistic. Fortunately, the manual goes into much greater detail, even including helpful Getting Started and Accounting Primer sections. Like DacEasy and Peachtree Complete, Pacioli includes look-up windows wherever appropriate.

The importance of numbering your chart of accounts is heightened with Pacioli because it includes your vendors and customers. The G/L maintains three years of budget and actual data and provides the flexibility to limit posting to specified periods. Version 2.0 provides for recurring and reversing transactions.

An auditing feature assists in the reconciliation of bank accounts and other account balances. You signify that a transaction has been cleared or

reviewed by entering an electronic check mark. Users can't enter bank charges or other adjustments from this screen.

Pacioli's inventory module supports the sale of both products and services; multiple invoice formats are provided to support either type of sale. You can assign a default sales-tax rate to each customer, but Pacioli provides only limited sales-tax reporting. You can choose from five inventory costing methods: LIFO, FIFO, standard, average, and last. A New Prices feature automatically applies a percentage increase or decrease to the purchase price, sales price, or gross margin of any item--handy for companies that often alter their pricing.

Pacioli's standard reports are limited in number but flexible as to selection criteria and sort fields. There are only five A/R and A/P reports, and sales analysis reporting is lacking. You can create financial statements by using Pacioli's Report Generator. This powerful report writer can produce complex, 14-column financial spreadsheets.

For those requiring still more accounting features, M-USA will soon offer Mondial, a $199.95 DOS-based accounting system. Its more notable features include multicurrency conversion, multiwarehouse inventory, item assembly control, job cost, and point of sale. Mondial should be available by the time you read this.

PEACHTREE COMPLETE ACCOUNTING FOR DOS

Peachtree Software's Peachtree Complete Accounting for DOS, Version 7.0, incorporates 140 new features, including an Order Entry module. The full package ($249) consists of nine modules: G/L, A/P, A/R, Invoicing/Order Entry, Inventory, Payroll, Purchase Order, Job Cost, and Fixed Assets.

Peachtree Complete's G/L supports account numbers of up to six digits, the last two being dedicated to departmental reporting. Furthermore, you can produce consolidated financial statements for up to 32 subsidiary companies, as long as the account-number length is consistent for all companies.

You can maintain budgets by account for each period in current, prior, and future years. Transaction detail can remain on-line for the entire fiscal year but will be deleted during the year-end close.

Peachtree Complete now lets you enter default payment terms in the master vendor record, so terms are automatically inserted during invoice entry. This much-needed enhancement speeds data entry and minimizes errors.

You can distribute an invoice to a maximum of eight G/L accounts. Peachtree Complete allows up to 35 separate checking accounts; a separate Bank Account Manager system, $79, helps you reconcile them.

Quotes and orders are entered from the same screen as invoices, minimizing training time. You can convert quotes to orders or invoices by running a Convert option, or you can "insert" lines from an existing quote into an order or invoice. You can format quotes, orders, invoices, statements, and picking slips and lists.

Default customer information has been expanded in Peachtree Complete. Separate sales-tax codes are now assigned to each ship-to address, a must for companies that sell to many different tax jurisdictions. Each customer is now assigned a default price code, better ensuring accurate pricing.

Peachtree Complete's inventory module supports the sale of products or services from a single warehouse location. Each product can be assigned one of five costing methods: standard, average, specific unit, LIFO, and FIFO. You can define a bill of materials for items you assemble. A simple build feature increases the quantity of assembled items while correspondingly decreasing the quantity of component items. Peachtree Complete also tracks serialized items.

For specialized reporting needs, Peachtree Complete includes a Data Query module. Based upon the popular IQ report writer, it lets you create and save custom reports, queries, and graphs.

COMPANY NAMES: DacEasy Inc.--Products; M-USA Business Systems Inc.--
 Products; Peachtree Software Inc.--Products
DESCRIPTORS: Accounting--Computer programs
SIC CODES: 7372 Prepackaged software
TRADE NAMES: DacEasy Accounting 4.4 (Integrated accounting software)--
 evaluation; Pacioli 2000 2.0 (Integrated accounting software)--evaluation
 ; Peachtree Complete Accounting 7.0 (Integrated accounting software)--
 evaluation
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TS8/9/17

TEXT:
     Computer-Assisted Manufacturing Planning And Control For Job Shops
     Where's The Business?
     Before a computer will serve any business, there must be a database
that is suitable for that organization's specific requirements.
     Contract shops have their own very special needs since they provide a
service rather than market a product. Therefore, a computer database for
job shops has some unique requirements. This article discusses some basic
concepts about databases, current practices for quoting and order
processing, and general techniques for implementing the system as a whole.
It also covers what a database is and the benefits of using a database.
     Database Concepts
     A database is essentially a group of "storage bins" for information
in a computer. The database design depends on how a company will use this
information. The way the storage bins are set up makes it easy, or
difficult, to find information. Carrying the analogy further, a database
can be thought of as storage bins in a warehouse. Each bin has been set
aside for parts of a certain shape. All round parts go in one bin, all
square parts in another, and so on. This method would be very useful if you
were always searching for parts by their shape. However, if you wanted to
find a part by its number, it would be very difficult to find the proper
storage bin for that part. Hence, shape would be a poor design concept.
     A series of filing cabinets can be related to a computer database.
Conceptually, there is very little difference except for the physical
storage medium (paper versus magnetic images on disks or tape) and ease of
access (computers are faster than file clerks).
     Almost any report in a manufacturing company illustrates this point.
It consists of bits and pieces of information from many parts of the
factory. A process plan for part fabrication (Figure 1) is a good example.
Several other reports and forms use some of the same information, but for
different reasons, such as a vendor purchase order, a work ticket (Figure
2), an assembly schedule, a master schedule, or process plan. The problem
is how to handle this bulky information effectively.
     A file clerk in this imaginary factory must design a filing system to
store, access and maintain information. Ideally this system would have the
following characteristics: * Information Independence--making the
information in the filing cabinets independent of the various reports
needed. Once the information is located, no effort should be required to
generate reports. * Information Non-redundancy--minimizing the number of
different files (filing cabinets, storage bins, and so on) which contain
the same information. * Information Relatability--having information in a
format that all reports and forms can easily use or modify. * Information
Integrity--improving the quality and consistency of information. *
Information Accessibility--making information easy to find and use. *
Information "Shareability"--ensuring that many users can access the same

files without delays or interference. * Information Security--keeping privileged information away from unauthorized users. * Information Performance--providing proper controls for changing the filing system as needs change. * Information Administration--supplying appropriate standards, procedures, and guidelines to ensure consistent evolution of the filing system.

The database for job shops acts as the file cabinets and helps achieve these objectives in a structured manner. The software is built using a database manager called Oracle R. Such a database uses simple forms with rows and columns, as shown in Figure 3.

The first module, Quote/Order Processing, served as a test case. This module was implemented first at all of the shops because it is the starting point for new jobs. It establishes the basic job information on which all other modules rely. Quote/Order Processing identifies customers, jobs, parts to be produced, delivery schedules, and price.

Current Quoting Practices

The quoting practices of the four job shops are very similar.

Requests for quotes may be written or telephoned. In either case, the request for a quote is recorded to keep track of the customer and the date when the response is due. In a strictly manual environment, the person preparing the quote searches for prior quotes or prior jobs. If the information is incomplete or misfiled, the quote has to be prepared without historical data for costing and scheduling.

One common problem was lack of reliable cost data. Sometimes shops are asked to quote on a part that is currently in production, but cost information is not yet available. Some companies end up quoting the same price and losing money even though they made the part before.

Another problem is that quotes are based on a rudimentary process plan with estimated machine hours. The quoting person usually has an hourly machine rate to estimate machine/labor costs to which is added the cost of material, tooling and so on. In some cases, this cost/price approximation is done on scrap paper and is not always filed with the quote response.

Most of the shops used a worksheet to prepare a quote manually. This worksheet requires: * engineering charges, if any, * a list of operations, * the time required for these operations, * hourly cost estimates for machine time, * cost of outside services, and * direct costs (material, tooling, fixtures).

The cost estimate is circulated to planning, quality and manufacturing departments for review before giving to management for approval.

However, it takes an experienced individual to prepare the first draft of the quote. To prepare accurate estimates, this individual must know current and prior jobs as well as machine capabilities. This individual must have access to job histories to prepare a bid which will be competitive yet profitable.

To automate quoting, it is important to establish a step-by-step routine for phone quotes and written request for quotes.

A good manual procedure prepares for automation and provides a backup procedure if the computer malfunctions.

Automated Quoting

The purpose of automating the quoting process is to produce quotes quickly and more accurately. It helps users organize, retrieve and report the information that supports quoting such as maintaining customer files, master part files, and employee files. Automated quoting should: * search for similar quotes/jobs, * copy prior quotes/jobs, and * prepare new quotes.

Two of the forms used in this module are shown in Figure 4. Quotes for a certain customer may be brought up on either of these forms by using Customer ID to query the system. Similarly, all quotes prepared by a particular person can be located. Any quote may be brought to the screen if

the quote number is known.

By using part number, customer or other information to query the system, data may be retrieved rapidly. The "copy" function allows the information to be transferred to another record or related to another quote.

The quote may be available to various users, such as accounting and scheduling departments, at the same time. In some cases, where quotes for a similar part exist, a broad estimate for a new quote is readily available, although this figure may be more closely estimated by looking through past orders and into job costing.

A history of quotes won and lost can be generated. This history provides better planning for future business.

Implementing other modules enhances the quoting function. For example, Process Planning permits viewing of process plans. Shop Floor Control provides accurate machine and labor times for more accurate cost estimates. The Financial Interface shows actual costs, even while a part is in production.

A working manual method for quoting must be in place before attempting to automate this function. A manual system establishes the procedures and responsibilities that systematic quoting entails. The computer is simply a tool for organizing and speeding up this function. The people involved must still understand their responsibilities. Computer software cannot fulfill those responsibilities for them.

Current Order Processing Practices

The current practices of the four test shops are similar. They all create a job folder when a customer's purchase order comes in, verify the price with the quote, and log the job in a ledger. The job folder contains all of the information about the order. Shipping schedule and quantities are maintained manually.

Information about the status of the order is often reported by word of mouth. Some type of open order report is maintained for tracking jobs internally. The job engineer and the shop foreman or the scheduler may be the only ones who know the status of the job.

With this setup, anyone wanting to know the status or details of a job must first locate the job folder or find the person who remembers the information. Changes to orders and shipping schedules may not always be available to those who need the information. Typed reports summarize job status for review meetings and will also answer questions from customers.

Shipping and invoicing are closely tied to order processing. These manual functions require retyping of line items on the shipper and invoice. Sales tracking and sales commissions are not easy to maintain.

Generally, keeping records of jobs-/orders-in-process had shortcomings. The four shops agreed on basic requirements for an automated system that would overcome these deficiencies. It must facilitate: * entering customer purchase orders, * keeping track of engineering change orders, * maintaining the shipping dates and quantities, * generating a list of current orders.

Automated Order Processing

Automating the order processing function improves order tracking. It is important to know what the progress of orders is and what percent of quotes have resulted in successful orders. The same information which is used for the orders can be transferred to the job. The function ties jobs to orders and helps maintain shipping schedule changes, engineering change orders, as well as order changes.

The automation of order processing now allows for entry of all order and related job information. Order processing includes obtaining needed materials. The purchasing department has to know what is needed and when. An active customer and vendor file is necessary to control order processing. Jobs may be tied to a customer with several addresses; for example, one for shipping, another for invoicing.

Figure 5 shows forms used in the Order Processing module.

Automation of order processing allows orders and their shipping dates to be viewed quickly. If a phone order comes in from a quote, the order can be assembled immediately on the computer by copying the quote to the job.

The open order reports keep managers informed. Any changes in the orders are easy to see. Actual ship dates may be compared to scheduled ship dates to see how well schedules are being met.

The status of open and closed orders is maintained through a form which allows each line item to be closed individually. An order cannot be closed until all line items have been closed. Jobs may also be reopened.

Since the Order Processing module establishes basic job and shipping information, it is the cornerstone for scheduling, costing, and resource control.

Early Lessons

As the shops learned how to use the system, they found that they wanted a little less flexibility and a little more control than originally thought. Each organization learned that computer failures can be devastating unless data backup procedures are observed. Having a workable manual system to fall back on also proved valuable.

Finally, everyone learned that a quote/order processing module had to respond to customers' needs rather than just the shops' own needs. [Figures 1 to 5 Omitted]

RICH DIESSLIN and FRAN O'CONNOR Solion Systems, Inc. Dayton, Ohio
CAPTIONS: Sample process plan for part fabrication. (forms); Sample work ticket for a fabrication process. (forms); Database logical structure. (chart)

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Electronic commerce: Implications of the Internet for business practice and strategy
Kambil, Ajit

ABSTRACT: The Internet and the emerging global infostructure pose new
opportunities and threats to business. The implications of these emerging
low-cost communications infrastructures on business practice and strategy
are discussed. Firms are using the Internet to improve innovation,
production, sales and service processes. Lower communications and
coordination costs impact business practices and strategies. Widespread use
of the Internet and related technologies will dramatically reduce
transaction costs, leading to a growth in electronic commerce and
productivity, while the reduction in transactions and coordination costs
will reduce the profit opportunities of inefficient firms, requiring them
to refocus their strategies.
TEXT: Advances in information technologies and electronics have resulted in
two simultaneous shifts: a dramatic expansion of computing hardware and
software capabilities and a dramatic fall in the unit cost of information
technologies. These shifts have led to the widespread adoption of desktop
computers and communications equipment, creating the building blocks of a
global information infrastructure.

Today the Internet is the prototype of the global information
infrastructure. This paper looks at the implications of the Internet and
new low cost data communications infrastructures on business practice and
strategy. Specifically these technologies impact four fundamental firm
processes: innovation, production, exchange and service. This paper then
considers the effects of ubiquitous and inexpensive communications on
business practice and strategy, identifying suitable firm responses to take
advantage of and respond to opportunities and threats presented by this new
infostructure.

THE INTERNET AS A PROTOTYPE OF THE GLOBAL INFORMATION INFRASTRUCTURE

The Internet is a collection of computer networks that interconnect
computers all over the world. Computers on the Internet are able to
communicate with each other because they use the internet protocol (IP-see
the glossary of technical terms) as a common method for routing and
transferring messages across computers.

Users of computers on the Internet have access to a variety of electronic
communication, information retrieval and interaction capabilities. The
basic functions of the Internet include support for:

1. Electronic mail and news services to send or broadcast messages to other
users,

2. File transfer to access and retrieve files from remote computers,

3. Telnet--the ability to use and connect to remote computers.

As hardware and software technologies advanced to client-server computing, new advanced functions have become available on the Internet. These include wide-area information services, which allow users to search for and retrieve text information distributed over multiple computer servers on the Internet, and the world wide web (WWW) services that allow users to navigate and browse multimedia documents on multiple servers using hypertext links. Of these new services, the WWW services are the most important and they operate in a true client-server model. On the user desktop, a client side browser software such as Mosaic and Netscape provides users with a graphical user interface. Using the browser, users interconnect to various servers on the Internet to access multimedia information, interact socially or undertake commercial transactions. The use of WWW is increasing rapidly due to its easy-to-use browser software, hypertext capabilities and access to multimedia information. It will soon surpass all other sources of traffic on the Internet. Emergent services on the Internet include videoconferencing, telephony and the distribution of audio.

Since 1993, the Internet has grown at an exponential rate. Surveys of the Internet show that the number of host computers connected to the Internet increased from 1.3 million to 6.6 million between January 1993 and July 1995. The Internet also reaches over 150 countries. The National Science Foundation planted the seeds for this rapid growth by subsidizing the Internet backbone networks and the use of the Internet in colleges and schools. However, the more recent dramatic growth in the use of the Internet is driven by customer demand for inexpensive communications, availability of interesting content, lowering of technology costs, and availability of useful software for Internet publishing such as the WWW servers and browsers.

The growth is also fueled by the decentralized nature of the Internet. No one firm owns or controls the Internet--all firms that are connected to the Internet pay for their own connections to the Internet and share in the capitalization and costs of providing backbone services. Thus, no one firm needs to raise all the capital required to organize, implement and manage the network centrally. The Internet also has an open standards process that benefits both users and providers of Internet software and services. This decentralized planning and funding model for a telecommunications infrastructure distributes investment risks and is radically different from traditional centralized models of telecommunications planning and proprietary investments telephone companies. It permits the network to grow quickly to meet user needs.

Estimates of the number of Internet users vary widely. Current estimates (in July 1995) are approximately 30 million users. These numbers are changing rapidly as the various on-line services purchase Internet providers and upgrade their services to provide full Internet access. A user survey by the Hermes project at the University of Michigan found users are well educated and affluent, making them an ideal target for marketing. This demographic survey also showed users of the Internet were primarily men, with a large number of international users. However, as new and different types of information content is made available over the Internet, the demographics of Internet users is becoming more diverse to include more women, the elderly and children. Students are increasingly exposed to the Internet in the K-12 setting, and nearly all universities provide students with Internet access.

Respondents to the Hermes survey also said that they gathered

purchase-related information over the network, stating that convenience was more important than price for many purchase decisions. This is to be expected for an affluent user group. In addition, users stated that their gathering of purchase-related information on the Internet surpassed the use and effectiveness of direct mail.

The growth in corporate use of the Internet and its usage for accessing marketing information highlight the increasing importance of the Internet as a commercial infrastructure. Today the Internet provides the largest common interactive data communications infrastructure in the world. It already provides wide access to content and a platform for dissemination to users and publishers of information. In the future this infrastructure will advance to provide real time multimedia capabilities, implemented and managed in a decentralized manner over communication networks provided by various international vendors. The business use of these capabilities and the emerging infrastructure will dramatically alter business practice and competition.

BUSINESS USE OF THE INTERNET

Today the cost to become an Internet publisher on the WWW can be less $3000 for hardware and software' and as low as $250 a month for a 56 kbp/s line to connect to the Internet. With such a system, an Internet publisher can serve thousands of users daily and publish and disseminate millions of pages. Similarly the cost of electronic mail is substantially below the cost of paper mail. The marginal costs of storage, communications and dissemination of a thirty-page document can be less than a penny.

Given declining costs of using the Internet, firms have used it primarily to reduce communications and publishing costs and to improve the innovation, production, sales and service processes of the firm. For example, both corporate and academic researchers extensively use the Internet to communicate research problems and results. Using newsgroups, electronic mail, list services and the WWW, individuals are able to pose questions and receive answers from their peers. As universities, firms and publishers increasingly go online with working papers, technical reports and journal articles, individuals have instant access to relevant materials to support research and innovation. Information about innovations, or the innovations themselves, can be distributed world wide in a matter of minutes.

At Morgan Stanley, an international investment bank, Internet technologies are being used to create the company's electronic office. The routine reports, forms and documents used within the firm are distributed on World Wide Web servers within the company. These servers on the company's internal internet are protected from external break-ins with firewalls and proxy servers that prevent external and unauthorized access to information. Information on the internal servers may include mundane information such as telephone directories, to more critical information such as equity analysis reports, or even SEC filings retrieved from the global Internet external to the firm. As security and authentication issues are resolved, more communications with clients will occur on the Internet. Internet technologies were chosen as a platform for the electronic office for many reasons, including the flexibility of the technology to scale upwards, the open nonproprietary standards and the lower costs in comparison to alternate technologies. In the first eighteen months of operation, Morgan Stanley estimates that use of WWW technologies has saved the company over $1 million in paper handling and storage costs incurred in the daily production work of the bank.
Other firms are using the Internet primarily for sales and service by

advertising and providing customers with relevant information about a product or service. For example, General Motors' Saturn division publishes information about its products, dealers, and prices for consumers over the Internet. They also advertise at major sites on the Internet, so that users are aware of their product. In contrast, General Electric's Plastics division implemented a series of WWW pages that are targeted to their industrial customers with detailed information about their products. These include technical specifications as well as process information for the effective use of the products, The customers of GE Plastics receive Internet software that allows them to connect directly to GE's home page when they dial into the Internet. GE Plastic's Internet site is effective as it reduces the costs of customer support and provides their prospective or existing customers with rich value-added information to service and use effectively the products they buy from GE.

To date, the Internet is mainly used to displace communications and publishing costs in product and service firms. These applications do not directly affect the revenues of the firm. Substantial revenue growth from the Internet for firms will require more widespread use of direct electronic transactions and innovative revenue-enhancing customer services. This will require advances in three key infrastructures: software agent technologies, lower cost settlement and payment processes, and transaction templates.

Software agents are pieces of code that can be customized by a user to perform an information search or processing function. Software agent technologies promise to enable lowest price search for a good, or enable users to search for alternative suppliers at very low costs.

Efficient and widespread adoption of paperless payment and settlement systems is the second infrastructure necessary for extensive direct transactions. Various systems currently exist, such as Netbill, Digital Cash, First Virtual, Netcheque, etc. All of these systems promise to lower the transaction costs of payment and settlement dramatically. While some current systems charge at a rate comparable to credit cards, over time the costs of these systems can be expected to drop substantially closer to a few pennies per transaction. The Netbill system is already designed to cost a few pennies per transaction, although it is limited in use for the sale of information products. (2)

Transaction templates are the third infrastructure necessary for widespread electronic commerce. Transaction templates provide standardized ways of describing products as well as transactions. Standardized message formats are important because they provide well-agreed upon models for users to specify products, as well as receive information on quality, price, and other features of the product. The Electronic Data Interchange (EDI) community has developed some standardized templates for message exchange customized to different industry sectors. However, more needs to be done to establish standards for describing consumer goods (in terms of features and quality attributes) and to port EDI systems and standards onto the Internet. Transaction templates will makes it easier for software agents to search and compare products and should accelerate the growth of electronic commerce.

As software agents, inexpensive settlement and payment systems, and transaction templates are implemented over a low-cost communications infrastructure, both consumers and firms can expect dramatically lower transactions' costs in purchasing goods and services.

IMPLICATIONS OF THE INTERNET FOR MANAGERIAL PRACTICE AND BUSINESS PROFITS

The key managerial challenge of the emerging global infostructure will be to reconfigure organizations to create and maintain high profits in a low transaction cost environment. Transaction costs are the various costs incurred in the purchase or sale of a good or service. These costs include those of searching for and identifying products, drafting, negotiating and safeguarding the terms of a sale or purchase, payment and settlement, and the costs incurred to enforce contracts or to correct and resolve contract disagreements. As communication becomes inexpensive, and software agents technology and transaction templates are better defined, the transaction costs incurred by firms and individuals will fall. This in turn will make markets much more efficient.

Companies that exploited market inefficiencies arising from information asymmetries between buyers and sellers, or those companies that leveraged transaction cost advantages by locating close to customers to reduce the customers' search and purchase costs, will find their profit margins and competitive advantage erode. Indeed, most distribution and retailing functions will find increasing pressure on margins as market efficiency increases and transaction costs fall.

The decrease in transaction costs also provides new opportunities to managers. Firms will be able to outsource for more inputs and functions and take advantage of economies of scale in production available to external vendors.(3) In this model, the Internet and the emerging infostructure provide firms with the monitoring and information processing capabilities to manage the sourcing of inputs effectively. This will lower production costs of firms but also reduce any comparative advantage from outsourcing as competitors imitate similar practices.

A second major challenge to managers and individuals is the need to be alert, correctly interpret, evaluate and respond to information and issues that arise in the electronic space. Managers and individuals will find they must process and respond to new issues in an accelerated time period. For example, when a flaw was discovered in Intel's Pentium processor, it was originally transmitted on the Internet, as was the software to determine if there was an error. Intel initially played down the error as insignificant and not likely to affect most users. However, discussions on the Internet created substantial consumer pressure that led Intel to change policy and permit users to replace flawed chips at no charge.

Inexpensive Internet publishing allows individuals to disseminate favorable or unfavorable reports on products and services to a wide audience. Both managers and individuals need to be vigilant of rumors, and managers must address them clearly before it adversely affects products sales. Today individuals, public action groups, companies and politicians also are using the Internet to further or promote different political agendas. For example, the Bell Operating Companies maintain a WWW page to provide individuals with information on latest telecommunications legislation and the Bell Companies positions on these bills. Managers and individuals will find it harder to discern the specific biases and political agendas as more information is published in this new media, creating an information overload.

In summary, the key managerial challenge of the late 1990s will be to reposition the firm to thrive in electronic market spaces characterized by low transaction costs. Lowering transaction costs will have a major impact on profitability of firms that are inefficient in terms of production or distribution of products and services. Managers also must formulate strategies, effectively interpret and respond to information in this

infostructure, and develop clear and effective corporate communications in this media.

RECONFIGURING FIRM STRATEGY AND ORGANIZATION

Firms will have to reconfigure their strategies and organization to respond to inexpensive communications, lower transaction costs and reductions in profit opportunities from market inefficiencies in the emerging global infostructure. As management and economics researchers have noted, successful firms focus their strategies along a few salient dimensions for competitive advantage. Porter proposes three generic strategies: cost leadership, differentiation and niche. Treacy and Wiersema similarly identify three strategies: low cost, innovation and customer intimacy as ways of creating value for customers and sustaining market leadership. Industrial organization economists identify economies of scale, scope, externalities and innovation as sources of market power and higher or monopoly returns on investments.

Adapting the prior work, the following are strategic foci for reorganizing firm strategy to adapt to a world of increased market efficiency. These strategic foci do not necessarily require the use of the emerging infostructure, but identify ways of enhancing market power to realize superior profits in the new environment.

The strategic choices managers confront in responding to the emerging global infostructure are to:

1. Establish market leadership by leveraging economies of scale, scope or externalities.

2. Establish market leadership through innovation.

3. Establish market leadership though focus on superior customer service.
4. Enhance brand identity.

5. Exit from an industry segment.

Economies of Scale, Scope or Externalities

Economies of scale or scope can permit firms to lower their costs and increase margins. For example, in the retailing industry, organizations such as Walmart, and Federated have realized economies of scale through acquisitions or expansion and lowered unit costs in merchandise procurement and distribution. As firms transact over the Internet, it will be easier to compare the prices and services of firms that sell similar undifferentiated products. For example, consider a vendor who opens an electronic storefront to sell computer equipment and a product (e.g., a Pentium desktop computer). If the products and services are undifferentiated and not substantially different across firms, customers will choose the lowest price option. For the vendor to realize substantial profits in the electronic market, he or she must have sufficient scale to negotiate lower prices from the suppliers of computers and a high turnover in product to realize substantial net profit. Thus, achieving scale economies is one strategy for effective competition in the electronic space.
Firms can also realize market power from positive consumption externalities or weak interdependencies between customers. For example, the dominant WWW browser, Netscape, is provided virtually for free and has established a large market share. Netscape is constantly enhancing its browser to provide new features that rely on its proprietary seer. As more users use the Netscape browsers, other firms that develop innovative features on the WWW

are licensing their technologies to Netscape, giving Netscape a market advantage in the markets for sewer and browser software. This in turn creates a bandwagon effect, leading more users to adopt Netscape technologies and greater dominance of Netscape products in the marketplace.

Innovations

A second source of market leadership and superior returns arises from innovation in production, product or service. When innovations are proprietary and protected by patent, copyright or trade secret, they can give the firm market leadership and superior returns on investment. Examples of firms that base their strategy around innovation in products and production include Merck and 3M.

Innovations in the emerging infostructure include supporting tools for electronic communications and commerce, such as new WWW server software and security protocols and mechanisms.

Superior Service

A third source of market leadership and the ability to generate superior rents arises from providing superior service. The emerging infostructure is especially suited to supporting this strategy by enabling specialized or learning relationships with the customer. For example, a customer can specify in advance various purchasing preferences and needs to a vendor or to a vendor's specialized software agent. The vendor's software then can identify a select set of product options for the customer. The software also can remember prior purchases to suggest to the customer new purchases that build on prior purchases. Such a system reduces the customer's search costs and memory costs, but requires precise and sometimes private information from the customer. The Internet and similar networks make the cost of collecting such specialized customer information much lower for firms. Firms that collect this information and maintain it for their own use can then enter into a repeated service relationship with their customer, leveraging and growing information assets to improve the service relationship and thus generate greater revenues. Firms can also use the Internet to provide specialized information to the customer to enhance the service relationship.
An example of a firm using such tools is Individual Inc., which provides a customizable news filtering service to clients. A firm that enhances customer relations through the Internet is Federal Express, which allows users to track the exact status of any package sent over Federal Express services.

Enhancing Brand Identities

It is imperative for firms to establish recognized and valued brands in the global infostructure. While communications networks and software agents will enable individuals and firms to incur lower costs in searching for products, both individuals and managers will confront greater amounts of published information to interpret in order to determine the quality of goods available to them over the network. One way of reducing the information overload and processing required of managers or customers is to establish a brand identity. A brand identity typically associates a number of valued characteristics with the branded product and reduces the information processing required of the customer to value the product. A brand establishes a reputation for the seller and a promise between the seller and customer that the seller will honor the commitments associated with the brand identity.
Brands established over other media do not automatically transfer to the

Internet and the new media. The Internet provides a media with low-cost
entry for talented individuals to bypass traditional brand management
efforts, and to become opinion leaders in the establishment of brands.
Examples of opinion leaders in the Internet include the editors of Wired
magazine and its HOTWIRED site on the WWW, the individuals who developed
the Yahoo server at Stanford to point to interesting sites on the Internet,
or Professor Wayne Marr of Clemson University who rates business schools
and their presence on the Internet. Managers must develop brand management
strategies that adapt to the new opinion leaders in this media.

Exit

Inefficient firms that are unable to refocus their strategy to the models
outlined above can also choose to exit from an industry segment. Early
exits are likely to realize higher value than later exits when operating
margins and earnings decline.

In summary, firms will have to refocus their strategies. Successful firms
will avoid the price wars enabled by software agents undertaking lowest
price searches. If the firm has a cost leadership strategy, it must ensure
sufficient scale to turn over large transaction volumes on standard
products, and internal efficiencies to generate a small margin but large
profits based on the volume. If a firm competes on the basis of innovation,
it must acquire and maintain the resources and environments supportive of
innovation, and if a firm competes on superior service it has to invest in
information, training and other assets to sustain such a strategy. Hence
firms will have to refocus and organize around a fundamental source of
competitive advantage arising from economies of scale, scope, externalities
or proprietary advantages from innovation or service to realize higher
profits. If they are unable to transform their strategies, these firms
should exit those businesses that will be rendered unprofitable by the
Internet or similar communication infrastructures. Finally, managers will
have to restore and enhance their brand strategies to overcome the
information overload confronted by customers in this media.

CONCLUSIONS

To date, the use of the Internet for electronic commerce has been limited
to publication of information, advertising and communications among
individuals. Yet the Internet holds the possibility of transforming
commerce by enabling electronic transactions. As technical problems in
security systems, payment and settlement architectures and basic Internet
access are resolved, the accelerated diffusion and use of the Internet will
evolve. As new software agents and transaction templates are developed, an
increasing growth of commercial transactions on the Internet and similar
networks will occur.

The consequences of transferring more commercial activity to electronic
media will be dramatic reductions in transaction costs and profits gained
from exploiting differences among vendors in these costs. As transactions
costs fall, firms will have to rely on different and new sources of market
power to realize superior profits. This will require major restructuring of
business strategy and operations.

As firms prepare to undertake commercial activity in this new media,
managers must develop a coherent Internet strategy. This requires managers
to:

1. Recognize the interactive new media is different from television and
print, and users will have to utilize the media with entirely different

attention spans and behavior patterns.

2. Customize promotions and organization interfaces to multiple distribution channels and media segments. The Internet enables individuals to participate in smaller, more specialized electronic interest groups. Companies and marketers need to recognize and respond to this channel fragmentation.

3. Integrate marketing strategies across media. Many firms today separate the Internet activities from other promotional and selling activities of the firm, missing opportunities to cross-sell.

To adapt to the new competitive realities of the global infostructure, firms will have to rebuild their strategies and reengineer operations in terms of location, marketing and distribution. Existing assets, such as warehouses, etc., optimized to distributing through stores, will be suboptimal for home delivery. Existing firms may not be well positioned for electronic commerce, where product information is distributed electronically and products themselves are delivered by the mail.

The strategies and steps outlined above should help the firm to establish a presence in this new media more effectively in an environment of low transaction costs. The widespread adoption of electronic commerce should increase productivity by making transactions substantially more efficient.

FOOTNOTES
a See footnotes at end of text.

1 A Pentium computer with 1 GB of disk running Linux and public domain web server software.

2 Interviewed Professor Marvin Sirbu at Carnegie Mellon University, inventor of the Netbill system.

3 External vendors can realize economies of scale advantages not available to a single firm by aggregating demand of multiple firms for a product or service.

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GLOSSARY

browser--software that allows a user to connect to WWW documents and view their contents.

client-server computing: Clients are software programs that sit on the desktop providing formatting and other useful functions to the user. Servers are software that reside on remote computers that provide information to the clients to process for the end-user. This model of computing shares tasks between the client and server software modules.

HTML (Hypertext Markup Language) This is the principal language used to define documents on the World Wide Web. HTML is a markup language that allows for the creation of hypertext links between related documents or objects.

HYPERTEXT--documents with hyperlinks that allow users to navigate text or other types of document databases.

IP (Internet Protocol)--The standard protocol used to transfer data from machine to machine on the Internet.

Proxy server--A server that makes a request on behalf of a client instead of the client doing it directly. This is often required in the case of a firewalled network, where the proxy server sits on both the Internet and the secure internal network.

Netscape--A company founded by Jim Clark and Marc Andreesen that produces the most popular WWW browser.

software agent--a program that processes or seeks out information on behalf of its user.

World Wide Web (WWW)--The distributed, multimedia network of hypertext documents that operates on the Internet.

HOW BUSINESS ECONOMISTS CAN USE THE NET

As discussed in the article, the best way to access Internet resources is to use a WWW client such as Netscape to Mosaic browsers. WWW access is increasingly provided by all major online service vendors.

A number of resources are available for business economists on the WWW. Useful entry points are:

1. The Economics Working Paper Archive: http://econwpa.wustl.edu/wpawelcome.html

2. FinWeb--The Financial Economics Web Server maintained by Professor James Garven of the University of Texas, Austin: http://riskweb.bus.utexas.edu/finweb.htm

3. The NYU Edgar Site: http://edgar.stern.nyu.edu
These sites provide various entry points for economists into the Internet resources.

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